

Application No. 10/809,667
Docket No. 56681.US/4978.5

IN THE CLAIMS:

1. (currently amended) A method for making fibers and yarns having denier per filament (dpf) size ranging from about 1 to about 30 dpf and improved mechanical properties comprising:

blending from about 55 to about 95 wt.% polyolefin polymer and from about 5 to about 45 wt.% fibril forming polymer to provide a mixture of polyolefin and fibril forming polymers;

conducting the mixture to a hot melt extruder to provide a substantially homogenous molten mixture of polyolefin and fibril forming polymers;

forcing the molten mixture through a spinneret having a depth to hydraulic diameter (L/D) ratio ranging from about 3 to about 30 at a shear rate ranging from about 1000 to about 5000 reciprocal seconds to provide a fiber having a polyolefin matrix and elongate, substantially discontinuous fibrils of the fibril forming polymer dispersed in the polyolefin matrix, whereby an exterior surface of the fibers is substantially devoid of fibrils.

2. (original) The method of Claim 1 wherein the fibril forming polymer is selected from the group consisting of polyamide polymers and polyester polymers.

3. (original) The method of Claim 1 wherein the polyolefin polymer comprises polypropylene.

4. (original) The method of Claim 1 wherein the blend comprises from about 15 to about 30 wt.% of fibril forming polymer.

5. (currently amended) The method of Claim 1 wherein the L/D depth to hydraulic diameter ratio of the spinneret ranges from about 6 to about 10.

6. (original) The method of Claim 1 wherein the mixture of polyolefin and fibril forming polymers comprises from about 0 to about 20 wt.% polyolefin compatibilizer selected from group consisting of maleated polypropylene, maleated ethylene/propylene copolymer, maleated styrene/butadiene/styrene copolymer, maleated styrene/ethylene/butadiene/styrene copolymer, maleated ethylene/propylene/diene monomer (EPDM) copolymer and maleated ethylene/propylene-rubber (EPR).

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7. (original) The method of Claim 6 further comprising drying the polyolefin polymer, fibril forming polymer and compatibilizer to provide a mixture containing less than about 500 ppm moisture.

8. (original) The method of Claim 1 further comprising drying the polyolefin polymer and fibril forming polymer to provide a mixture containing less than about 500 ppm moisture.

9. (original) The method of Claim 1 further comprising dyeing the fibers with a dispersed dye, a reactive dye or a mixture of both to provide dyed fibers.

10. (original) The method of Claim 9 wherein the dyeing is conducted at a pressure ranging from about 1 to about 4 bar.

11. (original) The method of Claim 9 wherein the dyeing is conducted at a pressure ranging from about 1.5 to about 2 bar.

12-16. (cancelled)

17. (currently amended) A method for improving the mechanical properties of yarns made of synthetic fibers at temperature of higher than room temperature comprising:

feeding a mixture containing from about 55 to about 95 wt.% polyolefin polymer, from about 5 to about 45 wt.% fibril forming polymer and from about 0 to about 20 wt.% polyolefin compatibilizer selected from the group consisting of maleated polypropylene, maleated ethylene/propylene copolymer, maleated styrene/butadiene/styrene copolymer, maleated styrene/ethylene/butadiene/styrene copolymer, maleated ethylene/propylene/diene monomer (EPDM) copolymer and maleated ethylene/propylene-rubber (EPR) to a hot melt extruder to provide a substantially homogeneous molten mixture of polyolefin, fibril forming polymer and compatibilizer;

forcing the molten mixture through a spinneret at a shear rate ranging from about 1000 to about 5000 reciprocal seconds, the spinneret having a depth to hydraulic diameter (L/D) ratio selected between 1 and 3 for increased fiber dyeability with cationic dyes and an L/D depth to hydraulic diameter ratio selected between 3 and 30 for increased fiber dyeability with solution dyes, to provide a fiber having a polyolefin matrix and elongate,

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substantially discontinuous fibrils of the fibril forming polymer dispersed in the polyolefin matrix.

18. (original) The method of Claim 17 wherein the fibril forming polymer is selected from the group consisting of polyamide polymers and polyester polymers.

19. (original) The method of Claim 17 wherein the polyolefin matrix comprises polypropylene.

20. (original) The method of Claim 17 wherein the molten mixture comprises from about 15 to about 30 wt.% of fibril forming polymer.

21. (currently amended) The method of Claim 17 wherein the ~~L/D~~ depth to hydraulic diameter ratio of the spinneret ranges from about 6 to about 10.

22. (original) The method of Claim 17 further comprising drying the polyolefin polymer, fibril forming polymer and compatibilizer to provide a mixture containing less than about 500 ppm moisture.

23. (original) The method of Claim 17 further comprising dyeing the fibers with an acid dye to provide dyed fibers.

24. (original) The method of Claim 17 where the fibril forming polymer has cationic dyeability.

25. (original) The method of Claim 24 further comprising dyeing the fiber using a mixture of cationic dye and disperse dye.

26. (original) The method of Claim 23 wherein the dyeing is conducted at a pressure ranging from about 1 to about 4 bar.

27. (original) The method of Claim 25 wherein the dyeing is conducted at a pressure ranging from about 1 to about 4 bar.

28-42. (cancelled)